

Catalogue of American Amphibians and Reptiles.

Powell, R., J.T. Collins, and L.D. Fish. 1994. *Virginia striatula*.

***Virginia striatula* (Linnaeus)**
Rough Earth Snake

Coluber striatulus Linnaeus, 1766:375. Type-locality, "Carolina."

The type-specimen is not extant. Collector and date of collection are unknown.

Calamaria striatula: Schlegel, 1837:43. See Distribution.

Potamophis striatulus: Fitzinger, 1843:25.

Haldea striatula: Baird and Girard, 1853:122.

Conocephalus striatulus: Duméril et al., 1854:140.

Falconeria Bengalensis: Theobald, 1868:44. Type-locality, "Parasnath Hill" (India). Holotype not traced. See Distribution.

Virginia inornata Garman, 1883 (1884):97. Type-locality, "Texas" (Dallas). Syntypes, Museum of Comparative Zoology (MCZ) R-2453 (4), one adult male and three adult females collected by Mr. Boll, date of collection unknown (received by the Museum in December 1870) (not examined by authors).

Virginia striatula: Garman, 1883 (1884):97. First use of combination.

Amphidardis inornatus: Cope, 1888:391.

Potamophis striatula: Stejneger and Barbour, 1933:120.

• **Content.** *Virginia striatula* is monotypic.

• **Definition.** *Virginia striatula* is a small (TL of females to 324 mm, of males to 348 mm) colubrid characterized by a cone-shaped head, 16-20 maxillary teeth, 17 rows of distinctly keeled body scales, and usually with a divided cloacal scute. Ventrals number 112-132, subcaudals 26-50, and tail length is 18.5-23% of total length in males, in females comparable figures are 120-139, 29-45, and 14-19.5%, respectively. Head scalation is as follows: 2 nasals, 1 loreal, no preoculars, usually 1-3 postoculars, 1 + 1 temporals, 5 supralabials (the 3rd and 4th enter the orbit), and 6 (5-7) infralabials.

Dorsal ground color varies from gray to reddish-brown. A light transverse band (often obscure) may be present on the back of the head. The plain venter is cream to pink. Labial scales are gray to cream.

The hemipenis is 5-7 subcaudals in length and is asymmetrically bilobed and subcylindrical. Either the anterior or posterior lobe may be more diverted from the longitudinal axis. The sulcus spermaticus

is simple and terminates distally between the lobes. Proximal spines are set in fleshy lobes, are laterally compressed, sharply pointed, and recurved. After two large basal spines, the second somewhat smaller, spines increase in size up to about one-fifth to one-fourth the length of the hemipenis, then decrease until reaching their minimum size in the most constricted area about midway up the length of the organ. Distally the spines lose the fleshy lobe and are straighter, peg-like, and have smoothly rounded ends. They also decrease in number and get progressively larger, reaching their maximum size on the distal portions of the lobes. Much smaller spines of the latter type are found in the apical depressions of the lobes. The depressed area between the lobes is devoid of spines. The average level of origin of the retractor penis magnus is the twenty-first subcaudal, the retractor penis parvus originates at an average level of the sixth subcaudal.

• **Diagnosis.** *Virginia striatula* can be distinguished from its congener, *Virginia valeriae*, by the presence of 5 supralabials, usually only one postocular, and keeled dorsal scales.

• **Descriptions.** In addition to the original descriptions cited in the synonymy and those in many regional and national guides cited elsewhere, descriptions may be found in Theobald (1876, as *Falconeria Bengalensis*), Boulenger (1893), Blanchard (1923 [1924]), Wright and Wright (1957), Ernst and Barbour (1989), and Rossman and Wallach (1991).

The hyoid apparatus was described by Langebartel (1968), vertebral morphology by Holman (1962, 1963), cranial myology by Varkey (1979), size and position of visceral organs by Rossman et al. (1982), maxilla and maxillary teeth by Rossman and Myer (1990), hemipenes by Clark (1964a), scale structure by Jackson and Reno (1975), touch corpuscles by Jackson (1977), and microdermatoglyphic scale patterns by Blaney (1977), Price (1981, 1982), and Price and Kelly (1989).

• **Illustrations.** Line drawings are in Holbrook (1842), Garman (1883 [1884]), Cope (1900), Blanchard (1923 [1924], 1925), Haltom (1931), Pope (1937), Schmidt and Davis (1941), Smith (1961), Webb (1970), Collins (1982, 1993), Smith and Brodie (1982), Linzey and Clifford (1987), and Conant and Collins (1991). Colored illustrations are in Latreille (1801), Smith and Brodie (1982), Dundee and Rossman (1989), and Conant and Collins (1991). Black and white photographs are in Haltom (1931), Ditmars (1936, 1939), Schmidt and Davis (1941), Smith (1956), Wright and Wright (1957), Anderson (1965), Cochran and Goin (1970), Mount (1975), Collins (1982, 1993), Smith and



Figure 1. *Virginia striatula* from Chautauqua County, Kansas. Photograph by Suzanne L. Collins and Joseph T. Collins.

Brodie (1982), and Vermersch and Kuntz (1986). Color photographs are in Behler and King (1979), Linzey (1979), Martof et al. (1980), Ashton and Ashton (1981), Linzey and Clifford (1981), Jackson (1983), Tennant (1984, 1985), Johnson (1987), Ernst and Barbour (1989), Sievert and Sievert (1989), and Collins (1993).

The hemipenis has been illustrated in Cope (1895, 1900) and Clark (1964a). Varkey (1979) included an illustration of head musculature. Variation in head markings of two litter mates is illustrated in Clark (1964b). Bradford (1973) provided photographs of microscopic sections of the reproductive tract. Wright and Bishop (1915) illustrated embryos. Stewart (1990) included black and white photographs of histological preparations of placentae. Jackson and Reno (1975) included line drawings of midbody scales. Jackson (1977) presented photomicrographs of the epidermis and a touch corpuscle, a schematic of a touch corpuscle, and a line drawing illustrating the number and distribution of touch corpuscles associated with cephalic scales. Price (1981, 1982) provided photomicrographs of dorsal scales. Thomas and Hendricks (1976) illustrated letisimulation.

• **Distribution.** The species ranges from Delaware and Virginia through the Carolinas south to northern Florida, across Georgia, Alabama, Mississippi, and Louisiana to eastern Texas, and north into eastern Oklahoma, southeastern Kansas, and southern Missouri. The range is illustrated in Smith (1956), Wright and Wright (1957), Mount (1975), Behler and King (1979), Ashton and Ashton (1981), Smith and Brodie (1982), Ballinger and Lynch (1983), Ernst and Barbour (1989), and Conant and Collins (1991).

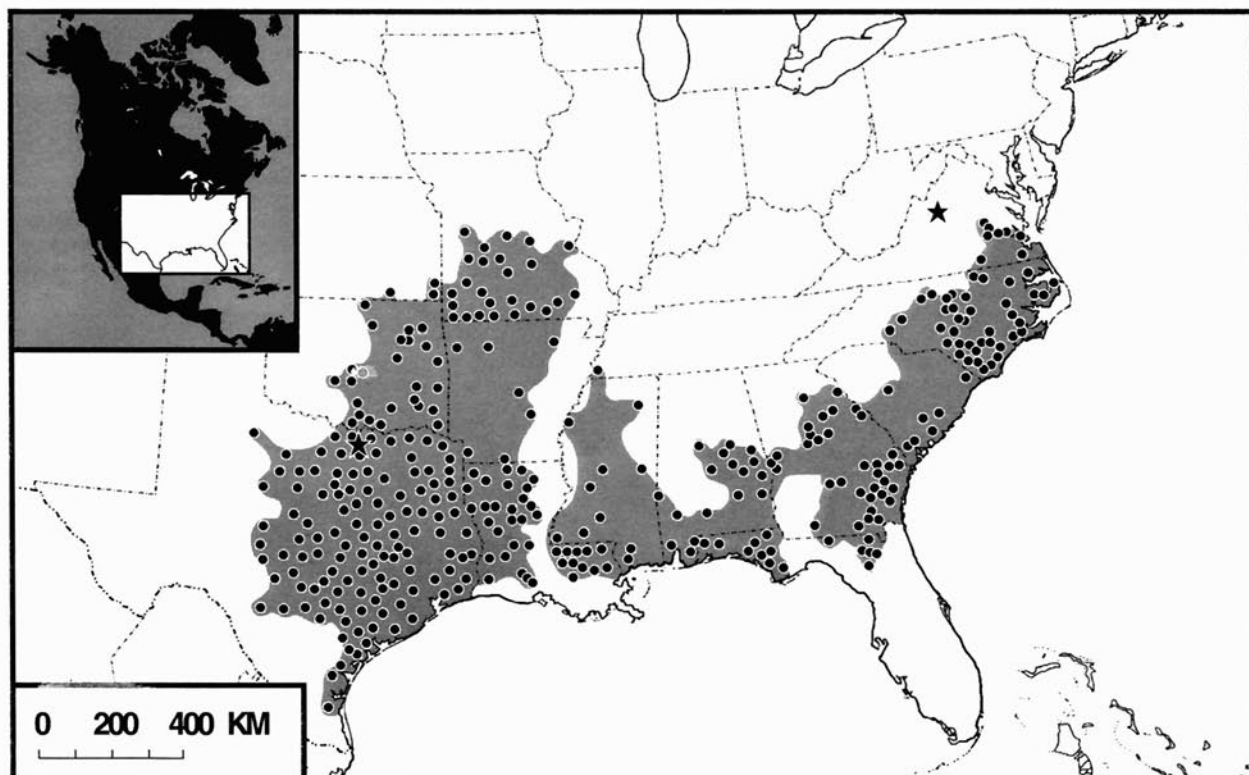
Notes and regional guides for various states or geographic areas include: Alabama, Haltom (1931), Mount (1975), Linzey (1979); Carolinas and Virginia, Gray (1941), White (1960), Brown (1979), Martof et al. (1980); Florida, Cope (1888), Carr (1940), Carr and Goin (1955), Ashton and Ashton (1981), Haast and Anderson (1981), Boundy (1994a); Georgia, Wright and Bishop (1915), Gibbons and Semlitsch (1991); Kansas, Smith (1956), Collins (1982, 1993); Louisiana, Limer (1954, 1955), Walker (1963), Dundee and Rossman (1989); Mississippi, Allen (1932), Cook (1954), Smith and List (1955), Cliburn (1958, 1970), Lohofener and Altig (1983); Missouri, Hurter (1911), Anderson (1965), Johnson (1987), Powell et al. (1990); Oklahoma, Schmidt (1919), Ortenburger (1926a, b, 1930), Force (1930), Burt and Hoyle (1935), Webb (1970), Sievert and Sievert (1989), Carpenter and Krupa (1989); Pennsylvania, Surface (1906); South Carolina, Corrington

(1929), Gibbons and Semlitsch (1991); Tennessee, Parker (1948); Texas, Strecker (1908, 1915), Van Denburgh (1922), Gloyd (1944), Blair (1949), Brown (1950), Raun (1959, 1965), Raun and Gehlbach (1972), Rakowitz et al. (1983), Tennant (1984, 1985), Dixon (1987), Thornton and Smith (1993), Vermersch and Kuntz (1986), Boundy (1994b); Virginia, Blem and Blem (1985), Linzey and Clifford (1987). Smith (1961) deleted the species from his list of Illinois snakes. Collins (1991) suggested that the Mississippi River and/or its floodplain acts as a distributional barrier.

Schlegel's (1837) notation that *Calamaria striatula* is also found on the island of Martinique and Theobald's (1868) *Falconeria bengalensis* from India are obviously in error.

• **Fossil Record.** *Virginia striatula* is known from the Pleistocene Clear Creek local fauna, Denton County, Texas (Holman, 1963, 1969, 1981). Guilday (1962) listed *Haldea* sp. from the Rancholabrean of Augusta County, Virginia. Gehlbach (1965) included Holman's data in his summary of Pliocene and Pleistocene records of North American amphibians and reptiles.

• **Pertinent Literature.** In addition to the general and regional works cited above, the following topics have been addressed: albinism (Palmer and Braswell, 1976), anatomy (Taub, 1967; Langebartel, 1968; Varkey, 1979), behavior (Kirk, 1969; Gehlbach et al., 1971; Thomas and Hendricks, 1976; Greene, 1988), blood (Dessauer, 1970), common names (Strecker, 1928; Collins, 1990a), conservation (Collins et al., 1981; Allen, 1987; Anonymous, 1987; Busby, 1988; Simmons, 1989), ecology (Surface, 1906; Strecker, 1927; Schmidt, 1932; Carr, 1940; Davenport, 1943; Stickel and Cope, 1947; Neill, 1948; Clark, 1949 [as *Haldea* sp.]; Guidry, 1953; Hamilton and Pollack, 1956; Brode and Allison, 1958; Bradford, 1973; Clark and Fleet, 1976; Gibbons and Semlitsch, 1981), extraembryonic membranes and placentae (Stewart, 1990), growth (Andrews, 1982; Dunham et al., 1988), karyotype ($2n = 36$) (Hardy, 1971), parasites (Harwood, 1932; Upton and McAllister, 1990; Upton et al., 1992), pheromones (Weldon et al., 1987; Mason, 1992), predation (Greene, 1984), reproduction (Rahn, 1939; Carpenter, 1958; Sabath and Worthington, 1959; Clark, 1964b, 1966; Fitch, 1970, 1981, 1985; Bradford, 1973; Mitchell, 1976; Devine, 1984; Blem and Blem, 1985; Whittier and Tokarz, 1992), size and sexual dimorphism (Curtis, 1949; Fitch, 1981; Powell et al., 1982; Collins, 1990b), and taxonomy (Cope, 1877, 1891;



Map. Range of *Virginia striatula*. The type-locality is too imprecise to plot, dots mark other records (some symbols represent more than one locality). Stars mark sites from which fossil records are recorded (the Virginia site is listed only as *Haldea* sp. by Guilday, 1962).

Garman, 1892; Schmidt, 1919; Blanchard, 1924; Zillig, 1958), . The species is listed in other checklists, guides, or keys by Harlan (1827, 1835a, 1835b), Holbrook (1842), Bocourt (1883), Yarrow (1882), Brown (1901), Ditmars (1907), Blanchard (1925), Burt (1935), Perkins (1940), Stejneger and Barbour (1943), Wright and Wright (1952), Schmidt (1953), Cagle (1968), Cochran and Goin (1970), Leviton (1971), Banks et al. (1987), and Rossman and Wallach (1991).

• **Etymology.** The name *striatula* is presumably from the Latin *stria* (= furrow or line) and *-ula*, a diminutive Latin suffix, possibly in reference to the keeled scales of this species.

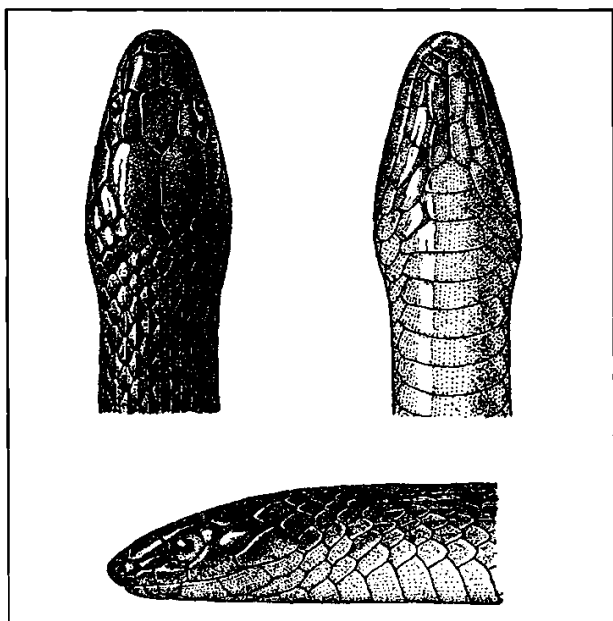


Figure 2. *Virginia striatula* (from Schmidt and Davis, 1941).

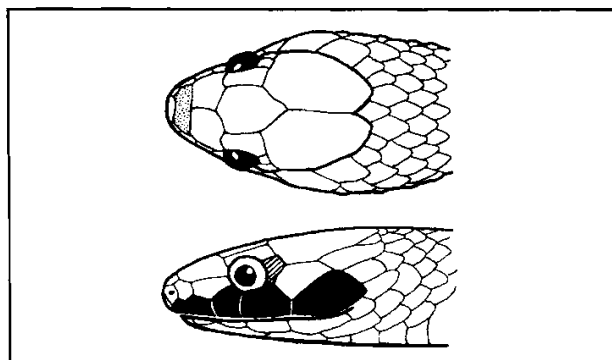


Figure 3. *Virginia striatula*, showing diagnostic characters (from Collins, 1982).

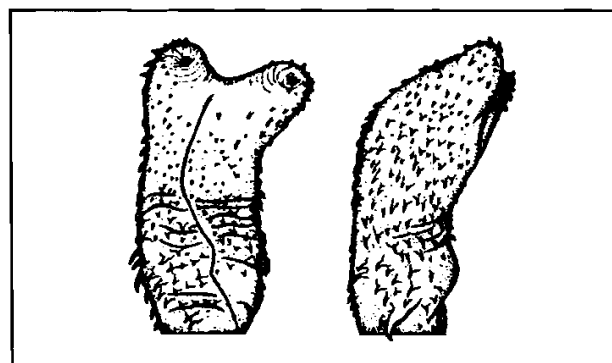


Figure 4. Median and posterior surfaces of hemipenes of *Virginia striatula* (from Clark, 1964a).

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